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of about fifteen tons per acre of green fodder, after having been down from grass from the original seeding six years.

From the analysis of alfalfa for different years as grown at the station, at the period of full bloom it was found to contain 67.46 per cent of water. With the figures of the analysis as the basis, it is found, that if the fifteen tons of green fodder, having a composition like the above, were converted into hay, they would be equal to 5.6 tons of hay per acre. The chemical composition of this hay is shown by analysis to be much like red-clover hay, and to contain nearly as much albuminoids as does wheat-bran. The total amount of fertilizing matter removed from one acre by the crop for the year was very large. Especially is this true of the nitrogen, potash, and lime. Alfalfa is pre-eminently a lime-loving plant, and it is generally recommended to apply a good dressing of lime to the soil before putting down to alfalfa.

In a feeding trial made at the station during the past winter, the digestibility of alfalfa hay was determined. The subject for experimentation was a four-year-old Jersey cow, in milk about two months when the trial was made. Feb. 23 the feeding of alfalfa hay was begun. Twenty-five pounds per day were offered, and, during the five days on which the dung was saved, an average of 24.31 pounds, or 389 ounces, per day were eaten. The amount of dry matter consumed per day was 322.7 ounces.

By comparison of the results with those for the digestibility of clover hay as found by Armsby, it is found that alfalfa is considerably more digestible than red clover. Especially is this true for the albuminoids and nitrogen-free extract.

Some notes from station experience, on the method of preparing the soil for planting out lucerne-seed and for curing the hay, may be of interest to those who contemplate making a trial of this crop.

Perhaps the best time to sow alfalfa is in the spring. The earliness will depend on the condition of the soil, moisture, and warmth. A crop that is to hold the ground, so long as we expect alfalfa to produce profitably, should have a faultless seed-bed prepared for it to start on. This is especially desirable where the first year's growth may be expected to be small, and may be overcome by weeds if any exist with it, and care is not taken to reduce them to a minimum. It would be well to specially prepare a suitable piece of land with a late summer fallow, or some crop which can be kept hoed free from weeds. Then, when the land is in good condition to work in spring, make a nice bed, and, if there is likelihood of many weeds starting on it, wait a week for them to germinate, harrow up well, and at once sow the alfalfa-seed if it is to be broadcasted. If it is to be drilled and cultivated the first season, the harrowing before seeding may be omitted. Roll the soil with a moderately heavy roller after sowing the seed. This will compact the soil about the seed, and hasten germination.

Having the crop started, one has only to watch the growth, and, if vigorous enough, it may be cut the first season. If allowed to stand too long, alfalfa becomes hard and woody in the stalk: hence a part will be wasted. It will also draw too largely from the roots for the good of the succeeding crops: so it seems best to cut it during the first period of good weather after the blossoms begin to appear. If designed for soiling, it should be wilted before feeding, to be sure that animals will not eat enough to cause hoven. This can be done by cutting feed one day ahead in fair weather, or longer if there is an appearance of storm.

If designed for hay, it must be very carefully handled, for like all the clovers, and to a greater extent perhaps, its leaves will drop off during the curing and housing, and leave only a mass of bare stalks instead of the bright green leaves and blue blossoms which ought to stay on for the best hay.

A good time to mow is in the afternoon, so it will wilt but not dry much before night. The next forenoon or toward evening, after the leaves become tough, pitch together into small cocks from the machine-swath.

Two active men can pitch from three to five swaths together quite fast, and, if wide barley-straw forks are used, there will be little use for a rake. After the cocks are made, they should stand two or three days before pitching over; then put two or three into one, if making well, and observe to turn every forkful bottom up, and spread out the thick green bunches so they will be brought

into contact with the dry portions. All the work of pitching, from the first to the final mowing away, must be done when the alfalfa is tough, but not wet from dew in the morning or evening. Never handle clover when it rattles, for the leaves will be broken and wasted. A second or third handling will be needed before the hay will be fit to store. The drawing should be done early in the forenoon; and, if the bottom layers of hay are wet, the cocks can be overturned from the sun, and, after a few minutes' exposure, will be dry enough to load. Alfalfa or other clover hay made in this way comes out fresh and bright, and retains its leaves and flowers to an extent beyond the belief of those who are accustomed to rake clover with a horse, open out the hay to the sun, and pitch it in the heat of the day. The value saved will be worth all the extra time, if any is required.

The result of the station experience with lucerne or alfalfa may be summarized as follows: 1. That lucerne or alfalfa may be successfully grown in New York State; 2. That when once established, it thrives well upon clay land, but will probably do better upon good light loam; 3. That seed two years old loses its vitality, and fails to germinate (undoubtedly many of the failures to secure a stand of plants may be traced to poor seed); 4. That the seed-bed must be well prepared, and in this latitude it seems best to plant out the seed in the spring, and with no other crop (the seed should be but lightly covered by rolling the ground); 5. That for seven successive years at the station three and four cuttings per year have been taken from the plats; 6. That last year, the sixth in succession, the plats yielded more than fifteen tons per acre of green forage, equal to 5.6 tons of alfalfa hay; 7. That alfalfa should be cut in early bloom, before the plants become woody; 8. That it should be cured largely in the cock to produce the best quality of hay; 9. That by chemical analysis the hay was found to be more nitrogenous than good red clover; 10. That cattle, sheep, and horses all relished the hay, and seemed to do well; 11. That it was found to be more digestible than red-clover hay; 12. That if farmers would try this crop, it is advisable to begin with a small piece of well-prepared land, in order to see whether alfalfa does as well with them as it has at the station; 13. That probably success with alfalfa will depend largely upon having fresh seed, a good, carefully prepared seed-bed, and in covering the seed lightly with soil.

HEALTH MATTERS.

PNEUMONIA. — Drs. C. W. Townsend and A. Coolidge, jun., of Boston, from a study, published in *The Medical News*, of all the cases of lobar pneumonia treated at the Massachusetts General Hospital, from the first case, in 1822, up to the present day, find that (1) in the thousand cases of this disease treated between those dates there was a mortality of 25 per cent; (2) the mortality has gradually increased from 10 per cent in the first decade, to 28 per cent in the present decade; (3) this increase is deceptive for the following reasons, all of which were shown to be a cause of a large mortality, — (a) the average age of the patients has been increasing from the first to the last decade, (b) the relative number of complicated and delicate cases has increased, (c) the relative number of intemperate cases has increased, (d) the relative number of foreigners has increased; (4) these causes are sufficient to explain the entire rise in the mortality; (5) treatment which was heroic before 1850, transitional between 1850 and 1860, and expectant and sustaining since 1860, has not, therefore, influenced the mortality rate; (6) treatment has not influenced the duration of the disease or of its convalescence. It must, however, be admitted that the present treatment of expectancy — a treatment which makes the patient as comfortable as possible, preserves his strength, and avoids every thing harsh — is certainly far more agreeable to the patient than the former heroic method. After these studies, we cannot but admire the regular and uniform manner in which pneumonia — that type of self-limited diseases — has run its course in all these years, uninfluenced by the varying treatment it has received.

DR. BROWN-SEQUARD'S HYPODERMIC FLUID. — The extraordinary statements made by Professor Brown-Séquard as to the efficiency of hypodermic injections of fluid expressed from certain tissues of young animals in senile debility have been to a certain

extent confirmed by M. Variot, who made a communication to the Société de Biologie on June 29. The patients chosen were debilitated men, aged fifty-four, fifty-six, and sixty-eight years respectively; and they were not informed of the nature of the treatment adopted. In all three cases the injections were followed by general nervous excitement, increased muscular power, and stimulation and regulation of digestion. M. Brown-Séquard said that M. Variot's observations disposed of the objection that the results he had observed in himself were due to "suggestion."

THE HEREDITY OF MYOPIA.—If the opinions of various ophthalmologists concerning the heredity of myopia were recorded here, the result would be an accumulation of vastly conflicting statements. This, however, would be largely due to lack of precision in investigating the subject. Lately Dr. Motais has carefully studied both the history and course of disease in 330 cases of myopia occurring in young people, and has arrived at the following conclusions, which are given in *The Medical News*: 1. The hereditary influence of myopia is manifest; 2. Out of 330 cases, the families of 219 were afflicted with the same disease (this shows a percentage of 65 per cent); 3. Hereditary myopia is distinguished from acquired myopia by (a) its more early appearance, (b) its more rapid development, (c) its greater severity, (d) its being more frequently followed by other complications (in short, hereditary myopia is far more serious than the acquired form of the disease); 4. Myopia is usually transmitted from the father to the daughter (86 per cent), and from the mother to the son (79 per cent); 5. The principal conditions which favor the transmission of hereditary myopia are, (a) use of the eyesight under bad hygienic surroundings (whether in school or at home), (b) Astigmatism (14 per cent), (c) Microsæmia (diminution of the orbital arch), 16 per cent; 6. The increase of the disease in hereditary cases was, in 6 per cent of the cases, found to be mainly the fault of those who had charge of the child's education. If care is not taken, acquired myopia will not restrict itself to the individual, but may also be transmitted unto their children.

ELECTRICAL NEWS.

WIRING OF SHIPS.—In order to avoid any disturbance of the magnetism of the compass of a vessel by the powerful currents used in electric lighting, Sir William Thomson recommends the exclusive employment of a two-wire system, the positive and negative mains being not far apart save in those cases, of rare occurrence at present, in which alternating currents are employed. A galvanometer of simple construction should also be made use of, for the purpose of ascertaining that the outgoing and return currents are of the same strength, or, in other words, that no leakage is occurring. Further, the magnetic leakage from the dynamo should not be sufficient to cause any appreciable disturbance of the compass-needle, which may be tested by observing this needle at the moments of starting and stopping the dynamo. In opposition to Sir William, says *Engineering*, Mr. Alexander Siemens, whose firm have fitted up a large number of vessels with the electric light, has not found any special precautions necessary, the single-wire system being employed in every case. As for the dynamo, he has never found any disturbance from this cause, provided that there was a distance of fifty feet between the dynamo and the binnacle.

BOOK-REVIEWS.

Autobiography of Friedrich Froebel. Tr. by EMILIE MICHAELIS and H. KEATLEY MOORE. Syracuse, C. W. Bardeen. 12°. \$1.50.

THE bulk of this volume consists of a letter from Froebel to the Duke of Meiningen, to which is added an extract from another of his letters, and several notes by the translators. The letter to the duke relates to the early part of the author's life, from his birth to the establishment of his school at Keilhau, where his system of education, since known as the kindergarten system, was first definitely carried into practice. The letter to the duke of Meiningen is unfinished, and whether it was ever delivered to the duke at all is uncertain. But, however that may be, the letter gives a full ac-

count, not only of the writer's early life and education, but also of his theory of education in general. His practical method, unfortunately, receives but scant mention; and, if we had no other sources of information than this book contains, we should be at a loss to know what his improvements in education really were. His theories however, and the pantheistic philosophy on which they are based, are expounded superabundantly, page after page being filled with what is little better than vapor. He is forever talking about the "unity and inner connection" of things, "the inner law and order embracing all things." Whenever he studied any subject, he always sought for this "inner connection," and he complains of Pestalozzi's school, which he visited, as lacking in inner harmony and unity. Precisely what he meant by these phrases it is sometimes difficult to ascertain; but they are repeated till the reader is weary of them. He had, as even his translators admit, an absurdly exaggerated sense of the importance of his educational methods. He seems to have thought that the wisdom of ages and the accumulated experience of mankind were worthless, and declared that he wanted "the exact opposite of what now serves as educational method and as teaching-system in general." Indeed, he seems to have thought that he was going to revolutionize the culture and life of humanity, whereas all he has accomplished is some slight improvements in the education of children. Of his ardent devotion and spirit of sacrifice for the good of others, this book bears abundant evidence. He was often in pecuniary difficulties, yet, amid them all, he steadfastly pursued his course after he had once learned his true vocation as an educator. It is to be regretted that the translators have not given a fuller account of Froebel's more elaborate experiments in teaching, to which he really owes his influence and fame, and which are scarcely touched upon in his autobiographical letter. As it is, we get from this book an interesting account of his early life, and of his theories and aspirations, but very little information as to the inception and introduction of those practical methods in which his real life-work consisted. However, we must be thankful to the translators for giving us the autobiography in English, and, as they themselves remark, wait till some adequate biography appears for the fuller information we desire.

AMONG THE PUBLISHERS.

"THE Life of Harriet Beecher Stowe," by her son, Rev. Charles E. Stowe, is now passing through the Riverside Press, and will be given to the public early in the autumn. It will be a book of peculiar personal and literary interest, and will appeal to a host of readers on both sides of the Atlantic. It is to be a handsome volume, embellished with fine portraits and other illustrations, and will be sold by Houghton, Mifflin, & Co. by subscriptions.

—Messrs. Ginn & Co. announce for publication in August "Myers's General History," by P. V. N. Myers, president of Belmont College. This book is based upon the author's "Ancient History" and "Mediaeval and Modern History," and is characterized by the same qualities as mark the earlier works. It is believed that the difficult task which the author set for himself, of compressing the fourteen hundred or more pages comprising the two text-books mentioned into a single volume of about seven hundred pages, has been accomplished without impairment either of the interest or of the easy flow of the narration. The greatest care has been taken to verify every statement, and to give the latest results of discovery and criticism. The book is provided with between twenty and thirty colored maps, besides nearly two hundred sketch-maps, woodcuts, and photogravures. The illustrations have been drawn from the most authentic sources, and nothing has been admitted save what is illustrative and truthful.

—Sampson Low & Co. have published a work entitled "Englishmen in the French Revolution," by Mr. J. G. Alger, which is based upon much personal research among unpublished documents both at the Record Office and in Paris. Besides incorporating two articles that originally appeared in the *Edinburgh Review*, dealing with the early days of the Revolution and the Terror, chapters are added about the prisoners of war, the opening of Paris by the peace of Amiens, and the subsequent imprisonment